

**Coal Policy Committee Presentation—**  
**Insights on Ecological Effects of Coal Development in the Eastern Slopes**  
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We realize the Coal Policy Committee will be weighing multiple factors to render recommendations to the minister of Energy. These will include social, cultural, health, economic and environmental considerations of coal development in the Eastern Slopes. Our submission is grounded in our experience as provincial biologists and in ecological arguments. It is not within our backgrounds to provide advice on the other aspects you will weigh; however we believe these all exist under the umbrella of environmental issues as Margaret Atwood and others have presciently pointed out: “The economy is a wholly owned subsidiary of the environment”. If open-pit coal mining cannot be undertaken without protection of the environment, none of the other aspects and arguments have much weight.

In our submission we have provided you our collective experience, observations, monitoring and research on open-pit coal mining in the Eastern Slopes over nearly a 50 year timespan. We have also provided you relevant research references on the ecological effects of coal mining on the aquatic environment, fish and wildlife populations and native plant communities. The submission touches on the processes involved in mine development, on a synoptic review of mine operations in the Eastern Slopes and on mine mitigation, compensation and reclamation.

Our conclusions and recommendations are evidence-based, objective, stark and might be uncomfortable to governments and the coal industry. Our presentation is only a synthesis of our lengthy submission—we encourage Committee members to spend time in reviewing our submission.

Title- Insights on Ecological Effects of Coal Development in the Eastern Slopes

Slide 2, 3- What does open-pit coal development look like?

Slide 4- Tent Mountain 1970s to 2000s. Heavy equipment coupled with explosives removes overburden which is dumped as close as possible to the excavation. The coal is removed, the site smoothed a bit, revegetation is attempted and the site is abandoned.

Slide 5- Cumulative Effects at a Watershed Scale. There have been at least 20 CEA undertaken in the Eastern Slopes over the past 23 years. All point out we are leading to or have exceeded thresholds for ecological integrity.

Slide 6- Crowsnest bull trout. The cost of ignoring CEA is that things go missing.

Slide 7- The Reality of a Shrinking Pie. CEA help us see the additive effects of all of our land use, that we no longer have a "full pie" of resources and opportunities left.

Slide 8- Because we focus on the immediate, we miss the additive impact of the past. Every site had some sort of regulatory approval, but there was no cumulative effects assessment.

Slide 9- Road Density. A key ecological threshold. Much of the Eastern Slopes is between 1.0- 5.0 km/km<sup>2</sup>.

Slide 10- Probability of occurrence compared with linear density. Native trout (black line)/ grizzly bears (red line). As linear density increases measures of biodiversity decrease.

Slide 11- Cumulative effects in the Oldman and Bow watersheds. Results of an Alberta Chapter of The Wildlife Society commissioned study.

Slide 12- Native trout status. All native species are in trouble throughout the Eastern Slopes.

Slide 13- Coal mine development. Process and issues

Slide 14, 15, 16- Coal exploration. Perfunctory assessments of issues, decisions rushed, no oversight, uncertain reclamation of the footprint.

Slide 17- Mine development: site preparation

Slide 18- Mine development: scale. Scale of a mine appears small but has impacts far beyond its immediate footprint.

Slide 19- Mine development: water capture and containment. Bare slopes , overburden dumps, roads all erode.

Slide 20- Coal Mine "Wrecks". Significant topographic constraints- steep, erodible, challenging terrain without room to place all safeguards. Planning failures-

climate change and extreme weather events. Low design standards- too low for prevailing conditions. Economics over environmental protection- a function of costs. Monitoring failures- lack of timely interventions. Oversight and enforcement- a “hands off” attitude.

Slide 21- Coal mines increase erosion and sediment transport.

Slide 22- Impacts on receiving waters. Chronic impacts.

Slide 23- Extreme weather events rarely modeled and incorporated. Hydrologic shifts increase the magnitude and frequency of floods.

Slide 24- Operational and structural failures

Slide 25- Massive sediment releases that are acute. Fish kills, wipes out benthic invertebrates.

Slide 26- Nothing can be assured with 100% certainty.

Slide 27- Fish aren't a product of the water. Impacts in the watershed will affect the aquatic environment and fish.

Slide 28- What do fish tell us about the watershed and our management decisions? If the presence, abundance and distribution of fish change it is a signal our management isn't working to maintain ecosystem integrity, stability and resilience.

Slide 29- Coal mines shift ecosystem performance.

Slide 30- What do coal mines do to fish?

Slide 31- Calcite. A product of mining that seals and cements stream substrates together.

Slide 32- Selenium. Results from the Macleod River watershed with multiple coal mines.

Slide 33- No successful treatment for selenium exists.

Slide 34- The aquatic environment is harmed by coal mining and trout and coal mines cannot coexist—conclusion.

Slide 35- What do coal mines do to wildlife?

Slide 36- Impacts to grizzly bears.

Slide 37- Mitigation? Mitigation, compensation and reclamation are often viewed as the “get out of jail free” cards for coal mines. The rationale is that if things can be glued back together then it means a mine can proceed. Steve’s birdhouse on the tree stump, a metaphor for mitigation.

Slide 38- Restoration lessons from nursery rhymes.

Slide 39- Assumptions on fisheries mitigation—these assumptions are not confirmed with quantitative monitoring.

Slide 40, 41- Dynamic stream systems

Slide 42- Fluvial systems operate with a set of physical rules that can't be changed.

Slide 43- Restoration is more than designing a channel

Slide 44- Retention of instream improvement structures. Because evaluation and monitoring rarely happens, the same mitigation works are proposed and built, over and over and consistently fail to provide any useful compensation for lost habitats and trout populations. Definition of insanity: “Doing the same things over and over, hoping for different results.”

Slide 45- Pre-disturbance wildlife biodiversity

Slide 46- Post-disturbance biodiversity

Slide 47- Mine reclamation does not provide winter range, a critical source habitat.

Slide 48- Vegetation species used for reclamation are mostly non-native agronomics—soft grasses. These lose protein in drought and after frost. Native grasses cure on the stem, retaining protein and are essential for overwinter survival of ungulates.

Slide 49- Presence/absence monitoring. Dependency on adjacent, native source habitats.

Slide 50- Land use planning

Slide 51- Say what you will about land use planning, it is science-based, comprehensive and has a substantial public involvement component.

Slide 52- “First pants, THEN your shoes”

Slide 53- Rules of the Earth

Slide 54- Balance economic development with the environment. Given the mandate of the Energy department and the AER it is hard to see where balance is achieved.

Slide 55- Pandora’s Box of Coal Development

Slide 56- Recommendations for content of the “new” coal policy.